CNC Video Measuring System

iNEXIV

VMA Series

Wide FOV Model
Nikon offers the ultimate usability for a wide variety of measuring applications with the wide FOV, long XYZ stroke iNEXIV VMA series.

- Automatically measures various components, such as plastic injection molds and electronic parts, with high accuracy and repeatability
- Allows measurements of tall and uneven objects with the long working distance of 73.5 mm

Three models in the iNEXIV VMA series are available, each with a different XY-stroke.

Wide field of view and sharp, clear images

A wide FOV of up to 13 mm x 10 mm (at 0.35x) allows easy search and alignment of measuring targets. The 10x zoom with five specific steps provides accurate measurement as well as high-resolution images. An excellent Apochromat objective lens with high NA (0.11) and low distortion has been specially designed for the iNEXIV series, providing crisp, clear images.

### Optical magnification

<table>
<thead>
<tr>
<th>FOV size on stage</th>
<th>Horizontal x Vertical (mm)</th>
<th>Video magnification</th>
<th>Total magnification on video window (micrometer)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/3” CCD size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.35x</td>
<td>10.0</td>
<td>4.8±3.6</td>
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</tr>
<tr>
<td>0.6x</td>
<td>7.8</td>
<td>7.75</td>
<td></td>
</tr>
<tr>
<td>1x</td>
<td>5.8</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>1.8x</td>
<td>3.5</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>3.5x</td>
<td>1.9</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

* Total magnification is that of video window with 640 x 480 pixels on 24 inch WUXGA monitor (1920 x 1200 pixels) recommended for VMZ-R series.

Robust 73.5 mm working distance

A long working distance minimizes the possibility of contact between the objective lens and valuable samples. Ideal for measuring large step heights and deep holes.

Large XY stroke and long Z stroke

Three models with different XY strokes are available: 250 x 200 mm, 450 x 400 mm and 650 x 550 mm. An extended 200 mm Z-axis stroke is perfect for tall samples.

### Three models with different XY strokes to suit various sample sizes

#### 250 mm(X) x 200 mm(Y) x 200 mm(Z) – Standard stroke

**iNEXIV VMA-2520**

A space-saving, low-cost model suited to measure small samples, such as electronic and die cast parts.

- **Stroke**: 250 (X) x 200 (Y) x 200 (Z) mm
- **Measuring head travel**: Z direction (single column type)
- **Stage travel**: X-Y direction

#### 450 mm(X) x 400 mm(Y) x 200 mm(Z) – Middle stroke

**iNEXIV VMA-4540**

Suitable for mid-size samples, such as molded and pressed parts.

- **Stroke**: 450 (X) x 400 (Y) x 200 (Z) mm
- **Measuring head travel**: X-Y direction (bridge type)
- **Stage travel**: Y direction

#### 650 mm(X) x 550 mm(Y) x 200 mm(Z) – Large stroke

**iNEXIV VMA-6555**

Suitable for large sample and simultaneous measurement of multiple parts.

- **Stroke**: 650 (X) x 550 (Y) x 200 (Z) mm
- **Measuring head travel**: X-Y direction (bridge type)
- **Stage travel**: Y direction
**Fast and accurate vision AF (Auto Focus)**

The high-speed vision AF offers high-repeatability and high-precision for height and depth measurement. Non-contact measurement using the vision AF does not damage or deform parts.

**Versatile illuminations**

The iNEXIV VMA series is equipped with episcopic (top), diascopic (bottom) and 8-segment ring (with 18-degree oblique angle) LED illuminators. Combining these illuminators with superior optics provides accurate detection of low contrast edges.

**Intelligent search**

Even when a sample is misaligned, the system automatically searches the target location based on the target image recorded in a teaching file. This enables accurate, automatic measurement by eliminating possible detection errors.

**Digital chart comparator**

Deviation of contours can be checked by overlaying charts generated digitally from 2D CAD data onto video images. Digital charts always accompany video images.

**Software**

**User-friendly standard software iNEXIV VMA AutoMeasure**

Provides enhanced ease of use and versatility based on Nikon’s years of extensive experience in developing the NEXIV series.

**Optional software**

- **iNEXIV VMA Profiler/CAD Reader**
  2D profile shape analysis program
- **iNEXIV VMA Virtual AutoMeasure**
  CAD interface off-line teaching support program
- **iNEXIV EDF/Stitching Express**
  Image analysis and archiving program for creating an all-in-focus EDF (Extended Depth of Focus) image from multiple images at different Z axis. This also generates a stitched image with super wide FOV from multiple images on the same XY plane.

**CMM-Manager**

A multi-platform metrology software to create teaching files that include 2D video measurement and 3D tactile measurement, and to provide easy operation for 3D graphic window.

**Auto MeasureEyes**

Enables easy operation for anyone and measurement programs can be created with just a few clicks.
**Optional Hardware**

**Touch probe for measurement of imperceptible parts**

The INEX IV VMA series can accommodate optional Renishaw® TP20 or TP200 touch probes. Touch probes provide measurements where vision AF cannot be used, such as the inner diameter of an oil seal or the clearance angle of an indexable insert. Measurement can be easily switched between video and touch probe, and both can be controlled by one teaching file.

![Inner diameter of oil seal](image)

![Clearance angle of insert](image)

**Extended 1.5x high-magnification**

Each model can be modified before shipment to extend the magnification to 1.5x, powerful enough for precise measurement of minute electronic parts.

*Video measuring images are slightly darker with the 1.5x high-magnification option, even with the same light intensity setting (0 - 100).

**Laser AF**

With a working distance of 63 mm, the optional Laser AF enables height measurement of flat surfaces with high repeatability, while keeping a wide FOV at low magnification.

![Smartphone charger](image)

![63 mm working distance](image)
## Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>VMA-2520</th>
<th>VMA-4540</th>
<th>VMA-6555</th>
</tr>
</thead>
<tbody>
<tr>
<td>XYZ Strokes</td>
<td>250×200×200 mm</td>
<td>450×400×200 mm</td>
<td>650×550×200 mm</td>
</tr>
<tr>
<td>Measurement range with TP (Touch Probe)</td>
<td>200×200×166 mm (TP200) 200×200×170 mm (TP200) 250×200×200 mm (with Vision AF)</td>
<td>400×400×166 mm (TP200) 400×400×170 mm (TP200) 450×400×200 mm (with Vision AF)</td>
<td>600×550×166 mm (TP200) 600×550×170 mm (TP200) 650×550×200 mm (with Vision AF)</td>
</tr>
<tr>
<td>Measurement range with TP &amp; MCR201</td>
<td>175×200×166 mm (TP200) 175×200×170 mm (TP200) 225×200×200 mm (with Vision AF)</td>
<td>325×400×166 mm (TP200) 325×400×170 mm (TP200) 375×400×200 mm (with Vision AF)</td>
<td>525×550×166 mm (TP200) 525×550×170 mm (TP200) 575×550×200 mm (with Vision AF)</td>
</tr>
<tr>
<td>Minimum readout</td>
<td>0.1 µm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum sample weight</td>
<td>15 kg</td>
<td>40 kg</td>
<td>50 kg</td>
</tr>
<tr>
<td>Maximum sample weight (accuracy guaranteed)</td>
<td>5 kg</td>
<td>20 kg</td>
<td>30 kg</td>
</tr>
<tr>
<td>Maximum permissible error² (L = Length in mm)</td>
<td>EUX.MPE [%]: 2+6/L/1000 µm EUY.MPE [%]: 4+6/L/1000 µm EUZ.MPE [%]: 3+L/50 µm</td>
<td>EUX.MPE [%]: 2+6/L/1000 µm EUY.MPE [%]: 4+6/L/1000 µm EUZ.MPE [%]: 3+L/100 µm</td>
<td></td>
</tr>
<tr>
<td>Camera</td>
<td>Black &amp; white 1/3” CCD, Color 1/3” CCD (option)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working distance</td>
<td>73.5 mm (63 mm with Laser AF)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnification</td>
<td>Optical: 0.35 to 3.5x (0.52x to 5.2x high magnification is available as an option) On screen: 12.6 to 126x with 24-inch WUXGA (1920×1200 pixels) monitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOV size on stage</td>
<td>13.3×10 mm to 1.33×1 mm (8.9×6.7 mm to 0.89×0.67 mm with high-magnification option)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autofocus</td>
<td>Vision AF, Laser AF (option)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illumination</td>
<td>Contour illumination and Surface illumination: White LED diascopic illumination Oblique illumination: 8-segment white LED ring illumination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video resolution</td>
<td>840×480 pixels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Touch probe (optional)</td>
<td>Renishaw® TP200/TP20</td>
<td></td>
<td></td>
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<tr>
<td>Power source</td>
<td>100 V-240 V, 50/60 Hz</td>
<td></td>
<td></td>
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<tr>
<td>Power consumption</td>
<td>5 A (100 V) : 2.5 A (240 V)</td>
<td></td>
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</tbody>
</table>

1: The INEXIV-dedicated MCR20 can be used for both TP20 and TP200.  
*2: Nikon’s in-house test at 20°C ±0.5k  
*3: With TP or Laser AF

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**Nikon Corporation Industrial Metrology Business Unit is certified as an ISO/IEC 17025 accredited calibration laboratory for CNC video measuring systems by the IA-Japan (International Accreditation Japan) as Accreditation No.JCSS0241.**

**ISO/IEC 17025: International standard, which specifies the general requirements to ensure that a laboratory is competent to carry out specific tests and/or calibrations.**

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**Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. April 2019 ©2014-2019 NIKON CORPORATION**

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**Nikon’s in-house test at 20°C ±0.5k**

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**Calibration and Measurement Capability (CMC), (K=2, Level of Confidence Approximately 95%)**

\[
\frac{L}{L_{\text{measurement length (mm)}}} \leq 420 \text{mm: } 0.32 \text{ µm} \\
420 \leq L \leq 1000 \text{ mm: } (0.29 + 0.64 \times \frac{L}{1000}) \text{ µm}
\]